



**UNITED STATES ENVIRONMENTAL PROTECTION AGENCY**  
WASHINGTON, D. C. 20460

OFFICE OF  
PREVENTION, PESTICIDES  
AND TOXIC SUBSTANCES

Chemical: Fomesafen  
PC Code: 123802  
DP Barcode: 302766,  
314014, 314112

**MEMORANDUM**

DATE: January 30, 2006

SUBJECT: Ecological Risk Assessment for New Uses of Fomesafen on Cotton (DP 302766), Snap Beans (DP 314014), and Dry Beans (DP 314112)

FROM: Paige Doelling Brown, Ph.D., Fisheries Biologist  
James Hetrick, Ph.D., Senior Chemist  
Nader Elkassabany, Acting Branch Chief  
Environmental Risk Branch 1  
Environmental Fate and Effects Division (7507C)

PEER REVIEWERS: Edward Odenkirchen, Ph.D., Senior Scientist  
Environmental Risk Branch 1  
Kevin Costello, Fate Scientist  
Environmental Fate and Effects Division (7507C)

TO: Joanne Miller, Product Manager, Herbicide Branch (23)  
Barbara Madden, Risk Integration, Minor Use,  
Emergency Response Branch  
Registration Division (7507C)

Attached please find the Environmental Fate and Effects Divisions's (EFED) environmental risk assessment for the proposed use of fomesafen (PC 123802) on cotton, snap beans, and dry beans. Fomesafen is proposed as a pre-plant, and pre- or post-emergent herbicide. It is currently registered for use on soybeans, and has been the subject of a number of Section 18 actions. Methods of application assessed include aerial spray (0.375 lb ai/A) and ground spray (0.50 lb ai/A). An alternative ground spray application rate (0.2 lb ai/A) was also considered.

Sufficient fate and toxicity data were available to conduct a screening level assessment. The majority of the studies used were submitted to the Agency in the 1980's, when fomesafen was initially registered. Existing fate studies were re-reviewed to establish half-lives, and new data evaluation reviews (DERs) were generated. Revised fate DERs will be transmitted under separate cover. In some cases, aquatic toxicity tests were conducted on formulations, rather than the active ingredient. If necessary, concentrations were corrected for percent active ingredient, and endpoints re-calculated. Details of the toxicity corrections are contained in the ecological effects data appendix. In support of the registration action, EFED requested and the registrant submitted seven aquatic and terrestrial plant toxicity studies (MRIDs 46673801-46673807). Based on initial review, these studies have provisionally been classified supplemental, and the data from them has been used in the risk assessment. These studies are currently undergoing the full review process, and the classification of the studies may be modified. DERs for these studies will be provided to RD at a later date, under DP 323262. Existing avian reproduction studies did not establish a lowest observable adverse effect concentration (LOAEC), so there is significant uncertainty associated with the chronic bird component of the assessment.

Key findings of this assessment include:

- The greatest acute risk associated with fomesafen use was for non-target terrestrial plants. Due to the high toxicity of the compound to terrestrial plants and proposed high application rates, spray drift buffers will likely have a minimal impact on reducing risk to non-target plants unless they are extremely wide (>900 ft for aerial applications, >350 ft for ground applications).
- Degradation of plant communities (hedgerows, wetlands, riparian corridors) surrounding the treated fields could have effects on the wildlife residing in or dependent on them.
- A significant concern is the persistence and mobility of fomesafen in both soil and aquatic environments.
- Accumulation in the soil of a field repeatedly treated with fomesafen may adversely affect crops subsequently planted in the field. Effects from a single treatment may persist for 3-18 months.
- Concentrations of fomesafen in shallow groundwater used for irrigation purposes may be high enough to adversely affect crops subsequently planted in the field.
- Fomesafen is practically non-toxic to slightly toxic to aquatic animals, both freshwater and estuarine/marine. No adverse effects to aquatic animals are anticipated based on proposed rates.

- Fomesafen does exert toxic effects on aquatic plants but risk quotients (RQs) for the scenarios modeled were below the level of concern (LOC).
- Fomesafen is practically non-toxic to slightly toxic to birds and mammals on an acute basis. Chronic reproductive effects were noted in rats. A chronic LOAEC for birds was not established. No acute risk LOCs were exceeded, but acute endangered species LOCs were exceeded for small mammals at application rates of 0.5 and 0.375 lb ai/A, but not at 0.2 lb ai/A. Some chronic RQs for both birds and mammals exceeded the LOC at all application rates. The meaning of the exceedence for birds is uncertain, as the guideline study submitted did not determine a LOAEC. Better data may significantly affect the chronic risk picture for birds.

### *Endangered Species*

- Based on LOC exceedences, the following taxa of endangered species were identified as potentially being at risk from fomesafen use: amphibians (terrestrial phase), birds, dicotyledon plants, mammals, monocotyledon plants, and reptiles. A LOCATES search (Ver 2.2.11) showed 807 unique endangered species are known to occur in counties growing cotton, snap beans, and dry beans. Of these species, 627 (78%) are plants. A significant number of these plants are endemic to Hawaii and California.
- Fomesafen is likely to affect plants near the treated areas, with potential effects extending to >900 ft away from the treatment source in the case of aerial application. Direct effects (reduction of growth, survival, or fecundity) may occur for endangered plants in the drift zone. Effects on non-endangered plants in the drift zone may constitute indirect effects (reduction of food or cover) on endangered animals.
- Based on an analysis of food habits and size, only 5 species of listed mammals appear to be in the direct acute risk category, at the maximum application rate (0.5 lb ai/A). Reduction of the application rate to 0.375 lb ai/A reduces exposure sufficiently that RQs for these organisms drop below the LOC.
- Based on an analysis of food habits and size, 13 species of mammals appear to be in the chronic risk category. RQ values for birds are used to estimate risk for reptiles and amphibians. Based on current chronic bird data, there may be chronic risk for birds, reptiles and amphibians at the proposed application rates of 0.5 lb ai/A and 0.375 lb ai/A. Reduction of the application rate to 0.2 lb ai/A reduces exposure sufficiently that RQs for all animals except 2 reptiles drop below the LOC.

### *Data Requirements*

In general, providing updated fate and/or toxicity studies to the Agency may reduce uncertainty in the risk assessment. Specific studies that may affect risk conclusions include:

- Avian Reproduction Study (71-4). The study the Agency currently has does not establish an LOAEC, only an NOAEC of approximately 50 ppm for both bobwhite quail and mallard duck. This NOAEC is based on the highest dose tested, and the actual no-effects may be higher.